

International General Certificate of Secondary Education
UNIVERSITY OF CAMBRIDGE LOCAL EXAMINATIONS SYNDICATE
PHYSICS **0625/5**
PAPER 5 Practical Test
INSTRUCTIONS

Friday **28 MAY 1999** Morning 1 hour 15 minutes

Great care should be taken that any confidential information given does not reach the candidates either directly or indirectly.

Instructions for preparing apparatus

In order to check the suitability of apparatus and material, the Physics teacher may study the question paper, in the presence of the officer responsible for question paper security, as soon as it is received. The Physics teacher should not copy the questions or make notes and, after it has been studied, the question paper should immediately be resealed with the other copies.

N.B. The candidates will be instructed not to write out a detailed description of the apparatus; instead, the Supervisor or teacher responsible is asked to give (and attach to the Report form printed on pp. 11 and 12) a *brief* description of the apparatus supplied, mentioning any points which are likely to be of importance to the Examiner in marking the answers. The Supervisor should also report any assistance given to candidates under the regulations explained on page 2. All reports should be signed by the Supervisor and by the person responsible for preparing the apparatus.

In addition to the usual equipment of a physics laboratory, each candidate will require the apparatus specified on pages 3–9. If a candidate breaks any of the apparatus, or loses any of the material supplied, the matter should be rectified and a note made in the Report.

These instructions consist of 10 printed pages and 2 blank pages.

Instructions for the Practical Physics Supervisor

A *Assistance to Candidates*

The purpose of the Practical Physics test is to find out whether the candidates can carry out simple practical work themselves. The Examiners are aware that candidates may sometimes be unable to show their practical ability through failure to understand some point in the theory of the experiment. If an Examiner were present in the laboratory, he would be willing to give a hint to enable such a candidate to get on with an experiment. In order to overcome this difficulty, the Supervisor is asked to co-operate with the Examiners to the extent of being ready to give (or allow the Physics teacher to give) a hint to a candidate who is unable to proceed.

The following regulations must be strictly adhered to.

- (i) No hint may be announced to the candidates as a whole.
- (ii) A candidate who is unable to proceed and requires assistance must come up to the Supervisor and state the difficulty. Candidates should be told that the Examiners will be informed of any assistance given in this way.
- (iii) A report must be made of any assistance given to the candidate, with the name and index number of the candidate.

It is suggested that the following announcement be made to the candidates.

'The Examiners do not want you to waste time through inability to get on with an experiment. Any candidate, therefore, who is unable to get on with the experiment after spending 5 minutes at it, may come to me and ask for help. I shall report to the Examiners any help given in this way, and some marks may be lost for the help given. You may ask me for additional apparatus which you think would improve the accuracy of your experiments, and you should say, on your script, how you use any such apparatus supplied.'

B *Number of sets of apparatus*

As a *minimum*, the number of sets of apparatus provided should be $N/4$, where N is the number of candidates (per session): a few spare sets should, preferably, be available to avoid any candidate being delayed when moving to another question.

Centres may find it more convenient and easier to administer if $N/3$ sets (plus one or two 'spares') of apparatus are provided.

The order in which a given candidate attempts the four questions is immaterial.

1 *Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)*

10 cm of clean, bare 32 s.w.g. (0.27 mm diameter) nichrome resistance wire or 20 cm of clean, bare 32 s.w.g. constantan resistance wire. See note 2.

Thermometer -10°C to 110°C . See note 5.

Supports for the thermometer; e.g. stand, clamp and boss. See note 3.

1.5 V dry cell or 1.5 V a.c. or d.c. power supply. See note 4.

Switch

Three connecting leads. Two of the leads must have a crocodile clip attached to one end.

Two crocodile clips for use with connecting leads

Stopclock or stopwatch, accurate to 1.0 s or better. Student's own stopwatch facility is suitable.

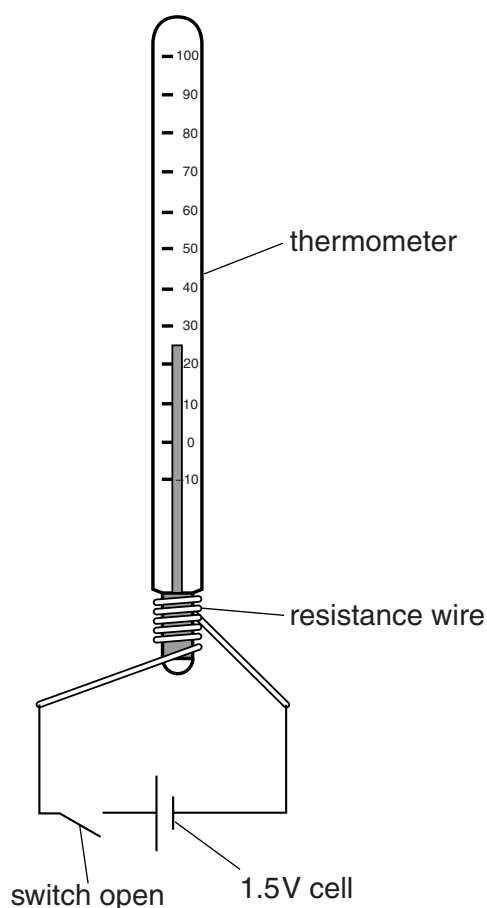


Fig. 1.1

Notes

- 1 The apparatus is to be set for the candidate as in Fig. 1.1, with the switch **open**.
- 2 The resistance wire is to be wrapped around the bulb of the thermometer and fixed in place. The temperature of the wire can reach 90 °C. Candidates must be warned not to let the temperature exceed 100 °C. Centres **must** ensure that any tape used to fix the wire in place does not melt or give off noxious smells.
- 3 The thermometer must be supported in such a way that the resistance wire does not have to hold the weight of the two crocodile clips and their respective connecting leads. An arrangement where the crocodile clips are resting on the table with the thermometer tilted backwards is suitable. The candidate can easily and accurately take readings with the thermometer in this position.
- 4 Any cell or power supply of approximately 1.5 V is suitable. A new cell will be needed for each candidate. The temperature of the resistance wire must increase by approximately 40 °C to 60 °C during the 2 minutes.
- 5 The thermometer bulb must be large enough for the resistance wire to be wrapped around the bulb so that the coils do not touch. A thermometer 30 cm long is suitable.

Items to be supplied by the Syndicate

Nil

Details to the Examiner

A sample set of readings

BLANK PAGE

2 *Items to be supplied by the Centre (per set of apparatus, unless otherwise specified)*

Rubber band, approximately 3 mm wide by 1 mm thick by 100 mm in length. See notes 3 and 4.

500 g mass in increments of 100 g. The masses must be able to be hung from the rubber band. A hanger, if used, must have a mass of 100 g and have its mass clearly labelled.

10 g mass. See note 2.

Stand, 2 bosses, one clamp and one rigid rod.

Metre rule

30 cm rule

Optical pin or other pointed object approximately 6 cm in length with a small piece of Blu-Tack or Plasticine attached to the blunt end.

Notes

- 1 Fig. 2.1 shows the apparatus as it is to be set up for the candidates, with the top of the rod set between 53 cm and 57 cm.

The 30 cm rule, the optical pin plus plasticine, rubber band and all the masses must be on the table in front of the candidate.

- 2 The 10 g mass must straighten but not extend the rubber band. If thicker bands have to be used, then a larger mass may be necessary and candidates must be informed of the change.

Candidates must be able to easily hang the 10 g mass from the rubber band.

- 3 The rubber bands should extend about 4.0 cm with a mass of 500 g. Candidates will be told to leave the 500 g mass on the rubber band for 2 or 3 minutes while completing the table. During this time, the extension should have increased by about 1 cm. The dimensions of the bands are not critical.
- 4 Each candidate will need a new rubber band.

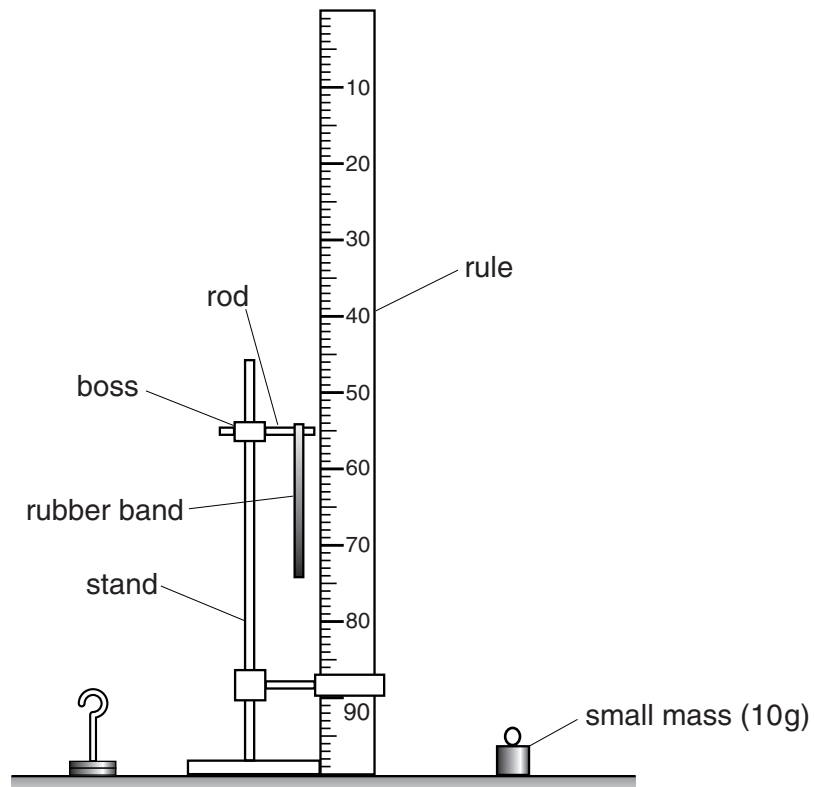


Fig. 2.1

Items supplied by the Syndicate

Nil

Details to the Examiner

Nil

3 *Items to be supplied by the Centre (per set of apparatus unless otherwise specified)*

Rectangular transparent block. The block is to be not less than 60 mm in length by 40 mm wide and 10 mm thick.

A ray box that will produce a narrow parallel beam of light.

Protractor

30 cm ruler

Notes

- 1 The experiment needs to be set up in a shaded part of the laboratory.

Items supplied by the Syndicate

Nil

Details to the Examiner

Nil

4 *Items to be supplied by the Centre (per set of apparatus unless otherwise specified)*

250 cm³ measuring cylinder, with increments of 2 cm³. See note 1.

Metal block. A 100 g brass mass is suitable.

A rubber block. A number 21 rubber bung is suitable. It must sink.

A wooden block. It must float. See note 2.

All three blocks must have a length of thread attached so that the blocks may be safely lowered into the measuring cylinder.

Approximately 200 cm³ of water in another container. Candidates will be told to pour a suitable volume of this water into the measuring cylinder.

Notes

- 1 The diameter of the measuring cylinder must be large enough for the three blocks to be lowered into it.

If the measuring cylinder is calibrated in ml then a label must cover this to read cm³.

- 2 Candidates will be told to lower the metal block on to the top of the wooden block causing both blocks to be totally immersed. The metal block must therefore have sufficient weight to cause the wooden block to submerge.
- 3 It is not essential for all blocks to be identical for all candidates.
- 4 The mass of each of the three blocks is to be written on a piece of card. Each mass is to be given to the nearest gram.

material	mass/g
rubber	
metal	
wood	

Items supplied by the Syndicate

Nil

Details to the Examiner

Measuring cylinder maximum scale reading and scale divisions if different from item (i).

BLANK PAGE

This form must be completed and returned with the scripts

REPORT ON PRACTICAL PHYSICS

(IGCSE MAY 1999)

General

The Supervisor is invited to give details of any difficulties experienced by particular candidates, giving their names and candidate numbers. These should include reference to:

- (a) difficulties due to faulty apparatus;
- (b) accidents to apparatus or materials;
- (c) any other information that is likely to assist the Examiner, especially if this cannot be discovered in the scripts;
- (d) any help given to a candidate.

Information required

A plan of workbenches, giving details by index number of the places occupied by the candidates for each experiment for each session, must be enclosed with the Answer Booklets.

Question 1. Sample set of results to be enclosed.

Question 4. Details of measuring cylinder used.



Information required (cont.)

A list by name and index number of candidates requiring help, with details of the help provided.

CENTRE NO.

NAME OF CENTRE

Declaration (to be signed by the Principal)

The preparation of the practical examination has been carried out so as to maintain fully the security of the examination.

SIGNED